

INVESTIGATING COLD EFFECT IN TEMPERATURE-MORTALITY ASSOCIATION STUDY

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Background and Aims: Numerous epidemiological studies have been conducted on the impact of temperature to health. However, distinguishing between the seasonal and temperature effects on mortality are controversial. The objective of this study is to investigate whether these effects influence the daily mortality in major cities at South Korea.

Methods: We used daily death counts and meteorological data, from 1992 to 2009, of 4 major cities in Korea; Seoul, Daegu, Busan, and Incheon. Then, we compared the local-weighted scatterplot smoothing models (Lowess/Loess) and generalized additive models (GAM) to analyse the association between the daily mean temperature and mortality. For controlling for time trends, we gave the number of observation years for degrees of freedom. We adjusted the effects of secular trends and other cyclical factors, day of the week, humidity, and air pressure. To separate the two effects: temperature and seasonal effects, we stratified the data sets by seasons, 12 months and examining the data. For our analysis, we used the R statistical software.

Results: The year-controlled and crude models revealed different features. We observed a V-shaped smoothing spline curves on the crude models of the four major cities. In the year-controlled models, however, the V-shaped curves disappeared and mortality linearly increased with temperature. Seasonal stratified data in the LOESS model indicated a higher mortality during the winter. In contrast, the GAM model had no relative relationship with mortality and temperature during the winter. Monthly stratified model presented a strong positive temperature-mortality relationship in July and August. On the other hand, the curves during the winter months showed inconsistent results of the four cities.

Conclusions: When we controlled the year and season, the temperature effects disappeared during the winter months. However, our month-specific analysis showed dissonant patterns in each city. We need to consider both local and regional effects for further investigation.

References:

Honda Y and Masaji O. Issues in health risk assessment of current and future heat extremes. *Global Health Action*. 2009 Nov 11;2.